GPU NUCLEAR

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April 20, 1998
1940-98-20208

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Licensee Event Report 98-004: Manual Reactor Scram Required due to Equipment Failure Resulting from Personnel Error

Enclosed is Licensee Event Report 98-004. This event did not impact the health and safety of the public.

If any additional information or assistance is required, please contact Mr. Kenneth Quintana of my staff at 609-971-4917.

Very truly yours,

Michael B Roche

Michael B. Roche
Vice President and Director
Oyster Creek

MBR/KCQ
Enclosure

cc: Oyster Creek NRC Project Manager
Administrator, Region I
Senior Resident Inspector

IE22

1148

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)

Manual Reactor Scram Required due to Equipment Failure Resulting from Personnel Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	20	98	98	004	00	04	20	98	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR □: (Check one or more) (11)							
POWER LEVEL (10)	71		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Thomas Corcoran, Plant Operations Engineer	609.971.4986

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	SH	FSV	A610	Y					

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 20, 1998, the steam supply valve to the Steam Jet Air Ejectors (SJAE) failed closed. Due to the loss of the SJAEs, main condenser vacuum decreased. With vacuum decreasing rapidly and approaching the low vacuum scram setpoint, the operators manually scrammed the reactor in accordance with station procedures. Plant response to the scram was normal and there were no unexpected activations of or challenges to engineered safety features. The cause was failure of the solenoid operated valves (SOVs) associated with the SJAE steam supply valves. The SOVs failed because they were not temperature rated for the environment in which they were located. The root cause was inappropriate replacement of direct acting solenoid valves with pilot operated valves with elastomer material not rated for the environmental conditions.

Immediate corrective action was taken to stabilize the plant and subsequently place the reactor in cold shutdown mode.

A detailed root cause and extent review was conducted by engineering. Prior to restart, the SOVs were replaced with valves rated for the environment.

Additional guidance will be developed for the design, procurement and installation of SOVs.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

DATE OF OCCURRENCE

The event occurred at approximately 0311 hours on March 20, 1998.

IDENTIFICATION OF OCCURRENCE

A reactor manual scram was inserted as a result of a degraded (lowering) vacuum condition in the main condensers (EIIC-COND). The low vacuum condition was a result of a loss of steam to the Steam Jet Air Ejectors (SJAE) (EIIC-EJR). The loss of the steam supply was caused by a failure of the supply air solenoid valves (EIIC-FSV) associated with both steam supply regulating valves (EIIC-PCV). The event is reportable under 10CFR 50.73(a)(2)(iv).

CONDITIONS PRIOR TO OCCURRENCE

The plant was operating at approximately 71% power (1375 MWth). The plant was at reduced load to facilitate replacement of the "B" Condensate Pump (EIIC-P) motor (EIIC-MO) as part of a pre-planned maintenance window.

DESCRIPTION OF OCCURRENCE

On March 20, 1998, at 0305 hours, the SJAE (EIIS-SH) steam high/low pressure alarm (EIIC-ALM) annunciated in the control room. The control room operator responded to the alarm and observed SJAE steam supply pressure at approximately 75 psig and decreasing. In accordance with station procedure, SJAE steam supply pressure is required to be controlled at 150-155 psig for optimum efficiency. The Group Shift Supervisor subsequently observed off-gas line flow to be indicating fully downscale which indicated that the SJAEs were no longer functioning. Due to the loss of the SJAEs, main condenser vacuum started to decrease rapidly. The operators took appropriate actions for the loss of condenser vacuum including a rapid power reduction and transferring the plant electrical busses (EIIC-BU) to the off site power supply (startup transformers [EIIC-XMFR]). Several additional actions were taken to return the SJAEs to service including transferring to the standby pressure regulating valve and attempting to open the valve locally at the pressure control station. These actions resulted in no increase in SJAE steam supply pressure. At 0311 hours, with all attempts to restore SJAE steam pressure failing and main condenser vacuum approaching the scram setpoint, the Control Room Group Operating Supervisor ordered a manual scram in accordance with plant procedure. Plant response for the scram was normal.

APPARENT CAUSE OF OCCURRENCE

The cause of this event was determined to be failure of the supply air solenoid valves associated with the SJAE steam supply regulating valves. The solenoid valves failed in such a way that the supply valves were closed and could not be opened. Subsequent analysis showed that the solenoid operated valves (SOVs), which were replaced in 1995, were not rated for the environment they were exposed to. Information that would have been pertinent to appropriate valve selection was not clearly conveyed in available vendor information at the time the subject SOVs were selected. When recently contacted, the vendor clarified that the temperature environment for the SOVs should not have exceeded a steady state temperature of 77°F and the valves were located in a 130-140°F environment for approximately three years.

The root cause of this event has been determined to be an inappropriate alternate replacement due to personnel error. Previous direct acting solenoid valves were replaced with pilot operated valves containing elastomer material not rated for the environmental conditions.

ANALYSIS OF OCCURRENCE AND SAFETY ASSESSMENT

While integral to proper turbine (EIIC-TRB) and condenser operation, the SJAEs provide no nuclear safety function. Although the SJAE steam supply valve failed closed unexpectedly, the operators completed all required actions in accordance with plant procedures. Additionally, if the operator did not manually initiate a reactor scram, the condenser low vacuum scram or turbine trip anticipatory scram would have fulfilled their safety functions.

Plant response to the manual scram was normal. During this event, plant systems operated as designed with all control rods (EIIC-ROD) inserting in accordance with Technical Specification requirements. Following the manual scram, reactor water level decreased below the reactor low level scram setpoint, as expected, and a reactor low level scram signal was initiated. Shortly thereafter a Scram Discharge Volume (SDV) (EIIS-AA) high level scram signal was initiated, also as expected. As the initial manual scram signal had not been reset, the two additional scram signals that were initiated after the control rods were fully inserted did not result in any further activation of engineered safety features.

CORRECTIVE ACTION

Immediate corrective actions were taken to stabilize the reactor plant and place it in the cold shutdown condition.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

CORRECTIVE ACTION (Cont'd.)

A detailed root cause analysis and extent review was performed by engineering management and included walkdowns of other plant areas to locate any additional installations of concern.

Prior to restart, all the SOVs associated with the alternate replacement package were replaced with valves properly designed and rated for the environmental conditions.

Guidelines, in the form of an updated checklist, will be developed for engineering / design / maintenance to strengthen knowledge on the application of SOVs during design / procurement / installation and will be promulgated within appropriate departments.

FAILURE DATA

1) Manufacturer: Automatic Switch Company (ASCO)
2) Model: 8316G54
3) Temperature Rating: 77°F steady state

SIMILAR EVENTS

LER 97-010 Manual Reactor Scram, ESF Actuation and Design Deficiencies Noted as a Result of Generator Exciter PM

LER 97-006 Reactor Shutdown Required by Control Rod 5% Scram Times due to Valve Diaphragms

CATEGORY 1

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CORCORAN,T. General Public Utilities Corp.
ROCHE,M.B. General Public Utilities Corp.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 98-004-00:on 980320,manual reactor scram was required. Caused by failure of supply air solenoid valves associated w/SJAE steam supply regulating valves.Stabilized reactor plant & placed in cold shutdown.W/980420 ltr.

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